Australian Energy Market Commission
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28 October 2021

Directions Paper - Review of the regulatory framework for metering services.

Thank you for the opportunity to comment on the Directions Paper reviewing the regulatory framework for metering services, published 16 September 2021.

This response is a joint response on behalf of both Rheem Australia Pty Ltd (RAPL) and Combined Energy Technologies Pty Ltd (CET), as we have a complementary interest in the AEMC's Directions Paper.

As the largest Australian manufacturer of water heaters with products in over 4 million Australian homes, we offer a wide range of traditional and renewable energy water heater models to the domestic water heating market under the Rheem, Solahart, Vulcan, Aquamax & Everhot brands. Under our Solahart brand we are the third largest supplier of photovoltaic (PV) systems in the country. Over the last three years we have also commenced the manufacture and installation of smart electric water heaters, controlled remotely by our technology partner, CET.

Combined Energy Technologies (CET) is an Australian technology company specialising in energy management for residential, commercial, and micro grid systems. CET provides home gateway devices and has extensive experience in the integration and orchestration of systems with multiple DER devices including the integration of solar PV, batteries, water heating, electric vehicle chargers, pool pumps and A/C for the benefit of the homeowner, retailer and the grid.

Together, Rheem and CET are already actively participating in the emerging DER market with thousands of online, mixed, orchestrated DER sites (Solar PV, batteries, smart water heaters, HVAC, pool pumps, EV chargers, other loads) across the NEM and the WEM. Over the past 8 years we have identified and resolved many issues (at live field sites) around how mixed, smart DER sites can be orchestrated to achieve the best financial outcomes for consumers, whilst providing a foundation for grid support services and hence grid security of supply.

This experience has given us a unique insight and particular interest into the issues raised in the Directions Paper and has coloured our responses to the questions raised within the paper.

In our response we have not sought to answer each of the questions posed and have instead focussed only those areas to which we can add value through our field experiences of behind the meter DER installations.

We have confined are response to the issues surrounding the required access to smart meter power quality data (Ref NER S7.5.1) locally at the *metering installation* on a *small customer* site, as this is a needed reform to advance the cost-effective deployment of DER. Our reasoning is given within our response.

For any regulatory changes to be effective though, the *metering installation* local access issues we have raised should be addressed in accordance with the “NEO rule making test”, to ensure equitable standards-based site level access to real time metering data so that DER assets are able to participate in site wide orchestration, DOE's and grid services.

As such we would welcome an invitation to be involved in the Commission facilitated "stakeholder workshops and/or roundtable meetings" as suggested in the Directions Paper, to further progress the ideas and proposals we have put forward in our submission.

As this submission has been prepared using the expertise of several Rheem and CET personnel, I would ask that any enquiries related to the submission are directed in the first instance to myself. I will then co-ordinate follow up responses to your enquiries or further meetings, if required, with the appropriate personnel within our organisations.

Yours Sincerely

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RHEEM/CET RESPONSE

Background:

Rheem / CET have deployed thousands of mixed DER systems at *small customer* sites whereby a power meter and edge gateway behind the *metering installation* provides sitewide HEMS DER orchestration of DER such as solar PV, smart water heating, battery systems, pool pumps, heat pumps, air conditioning, and EV chargers. The installations have been for the financial benefits of the consumer, for DNSP services such as DR (minimum and maximum constraint mitigation) and for AEMO grid services such as contingency FCAS for security of supply.

With regards to this consultation, we have identified a specific problem that we believe smart meters may alleviate, by assisting in the cost-effective deployment of behind the meter distributed energy resources. We draw on our daily experience as a tier 1 provider of orchestrated DER sites across the NEM and WEM in proposing that metering reform needs to consider access to real-time local (at the *metering installation*) revenue meter power quality data (Ref NER Table S7.5.1.1 specifically *connection point*:- *voltage*, *power factor*, *frequency*, *active power*, and current flow information) at a *small customer* site in real time (i.e. at no less a frequency than 1 second updates).

Alignment with the Directions Paper objectives:

We are in agreement with the Commission's statements that "A crucial enabler of smart meters providing more services is the access and exchange of power quality data they provide" and that "developing a data access and exchange framework that addresses the issues with the current arrangements is in consumers' long-term interests".

In its "State of the Energy Market 2021" report the AER noted "The ESB considers that current market arrangements, along with those for metering and connection, do not adequately support consumers wanting to participate in the (energy) market and are complex to navigate". While we are in agreement with the objectives stated in the Directions Paper, we are concerned that the recommendations fail to address some of the fundamental issues that would address the ESB's concerns. These include:

1. Local access to real time meter data. We would argue this is a fundamental requirement of a high penetration DER grid and to support the changes described in the ESB's post 2025 market design.
2. Speed of the rollout and penetration. The current rate of smart meter deployment is inadequate to support the current DER transformation
3. Reducing the cost of meter rollout. The greatest cost savings for smart meters can be achieved though leveraging economies of scale, which are not achievable under the current one-by-one meter install approach.
4. We believe that as a matter of choice and mobility between service providers, consumers should own and be able to assign access to the data from the revenue meter installed at their premises.

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Each of these is discussed in further detail below.

1. Local access to meter data

The ESB's Post 2025 market design emphasises the importance of DNSP's being able to implement Dynamic Operating Envelopes (DOE). It is generally accepted that this will need to be undertaken at the connection point for each NMI. It is concerning that this the important role of the smart meter for this purpose has not been considered in the discussion paper.

We currently provide energy management services based on a "whole of home" approach that mirrors the architecture required for DOE. It is for this reason we are involved in SA Power Networks implementation of this type of capability for their proposed Dynamic Export Limiting for PV by 1 July 2022.

Implementing DOE currently requires the installation of a second meter to enable local real time metering data, due to the regulations not enabling local access to the existing revenue meter. This could be avoided with approved providers being given local access rights to net import/export data from the revenue meter.

Whilst Table 2.1 correctly identifies benefits that smart meters can provide to DNSPs in greater hosting of DER, we believe that of equal importance are the benefits that can be realised to enable faster and more cost-effective consumer uptake of DER through local access to metering data.

We are concerned, however, that the type of framework envisaged, based on the options developed by NERA Economic Consulting for the Commission, will not solve the significant cost issues that will impact the affordability and uptake of behind the meter (BTM) distributed energy resources (DER).

In highlighting the need and reasoning for *small customer* access to metering data locally, at the *metering installation*, we believe we are aligned with one of the four areas of focus of the Commission's review, i.e.: that the "service that meters should enable – barriers to services and data being delivered via a meter where the provision of those services via a meter is most appropriate should be minimised".

Background to the access requirement for local power quality data:

Our experience is that it is unrealistic to assume that all BTM DER is purchased or installed by a *small customer* at the same time. Our experience on most *small customer* sites with existing DER installations is that there are multiple (and in some cases up to 4) power meters in addition to the revenue *metering installation*. This situation presents several issues:

- It is economically inefficient as the *small customer* will be paying either directly or indirectly for the multiple meters.
- Multiple meters create space constraints at the *small customer metering installation* which adds to the installation costs and complexity.

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- Once a *small customer* site DER comes under orchestration, for example by an IEEE2030.5 compliant site edge gateway for Dynamic Operating Envelopes (DOE), then all but one meter become redundant. Only one measurement of the NMI *connection point* power flow is required to orchestrate the site DER under the common connection point gateway

Our real-world experience aligns with the Commission's statement that "Installing separate devices to provide data which could be provided by the meter does not appear to be efficient". (Ref: Directions Paper S2.2.3).

It should also be noted that:

- The third-party meters typically measure voltage, current, frequency and power factor (per phase) which are used to determine the connection point/NMI power flow to or from the *small customer* site.
- The power flow information as calculated via the DER equipment vendor's metering gathers current flow information typically via clip-on CT's (current transformers) and phase voltage reference information from a dedicated RCBO (Residual current/safety circuit breaker) in real time.
- The real time metering data (voltage, current, power factor etc) is then used to calculate the instantaneous power (kW), which is used in the orchestration/ control of the *small customer* DER (typically by a local Home Energy Management System – HEMS) and to derive real time power (kW) and energy flow information (kWh) at the connection point for the *small customer*.
- Notionally, metering data values are read at 1 second intervals (or less), though for installations providing FCAS services, metering data will be read and stored at 50ms or less intervals to comply with the MASS.

The Newgate research detailed in the Directions Paper supports the access to real time consumption data, i.e. "In addition, participants with smart meters showed strong interest in being able to use real-time consumption data to budget more effectively", however effective orchestration of DER in real time needs to be at a local level and using more than just interval data such as kWh.

Real time power data for DER orchestration requires timely polling of the smart meter at no more than 1 second intervals. We would argue that it is unrealistic to provide revenue *metering installation* data (as detailed above) for millions of sites, for the purposes of local orchestration of DER and grid services in real time without local data access at the *metering installation* of the *small customer*.

An opportunity that should be explored, to take advantage of economies of scale and to future proof households in the energy transition, is to consider making revenue meters MASS compliant. At least one revenue meter manufacturer is already planning to launch a MASS compliant revenue meter by 2022. This would set up households for FCAS provision, the requirement for which will grow with further DER penetration.

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Further considerations to support local access to meter data are provided at Annexure A.

2. Speed of the rollout and household penetration

The Commission has acknowledged that the Retailer led deployment of Smart Metering has failed to deliver the pace or household penetration required to meet the requirements of the current energy transformation. While incremental refinements have been proposed, no evidence is presented by the Commission as to how these proposed refinements would overcome the key barriers. Ignoring this fundamental issue puts the benefits realisation of orchestrated DER at considerable risk and may remove valuable tools to ensure future grid reliability. Further it does not reflect the urgency that this issue deserves.

It would have been appropriate for NERA's cost benefit analysis to consider alternative regulatory framework options for meter rollouts. In particular, the speed and cost effectiveness of a mandated universal rollout against the current retailer led arrangements.

The effects and benefits of BTM DER are realised by the generators, TNSPs and DNSPs, irrespective of customer mobility between retailers and aggregators. We would argue that network meters under the energy transition should, once again, become the responsibility of DNSPs. DNSPs will be able to prioritise the roll-out of smart revenue meters according to network requirements and naturally work within geographies, as opposed to retailers who deal with a customer base spread across regions. The ability of a DNSP to prioritise and also to achieve economies of scale in installation are significant.

3. Reducing the cost of meter rollout.

We are concerned that the type of framework envisaged, based on the options developed by NERA Economic Consulting for the Commission, will not solve the significant cost issues that will impact the affordability and uptake of smart meters.

The Directions paper acknowledges that the current arrangements for smart meter deployment are not optimal from a cost perspective. In particular that meters are replaced one-by-one with meter installers being subject to inefficient travel schedules to install meters in disparate locations. This is the single largest inefficiency in the cost of smart metering, which has corresponding flow on effects to incentives and speed of rollout.

To the contrary, the greatest cost reductions to the cost of deployment would be achieved through the economies of scale from mass deployment and avoid the installer travel time for the current one by one approach. However, the Commission has not considered this option. Again, the NERA cost benefit analysis should have considered the unit cost of the counterfactual mandated rollout against the continuation of the current one-by-one approach.

Rheem also does not support the proposal to share the cost of meter deployments with third parties. Ultimately the consumer will pay the costs of metering through the services they receive. Dividing that cost up amongst different providers will simply incur higher

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administrative and finance costs. The Commissions focus should be to achieve cost savings for consumers by leveraging economies of scale and greater contestability in the rollout. We believe that smart revenue meters, capable of supporting DER, should become a network responsibility and a network cost.

4. Customer ownership and transfer of revenue meter data

With the emergence of DER, consumers are increasingly able to access revenue streams through the provision of network services using the DER in which they have invested. To manage the effects of increasing rooftop solar generation and other DER on the electricity grid, market and network operators are forced to implement export limits and other measures that reduce the return of investment in DER to the consumer. HEMS and network service provision are enablers for consumers to regain some control of their own costs. To make this possible in the most efficient manner possible, we believe support the concept of the consumer owning the access to the data from the smart revenue meter installed in their premises and being able to transfer that access to their chosen service provider, be that a retailer or aggregator.

It is also critical that inequities in access to smart revenue meter data are not inadvertently built into a system where energy industry stakeholders play multiple roles. By moving responsibility for smart revenue meter provision and roll-out to DNSPs and giving full rights to local meter data access to consumers, all industry service providers will compete equitably. This market competition will drive efficiencies in costs and revenue to consumers from full ownership and control of their own DER and the meter data required to orchestrate it for HEMS and grid services.

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Annexure A - Further considerations to support local access to meter data

Reasoning for local *metering installation* access to power quality data:

The Directions paper correctly identifies that "A crucial enabler of smart meters providing more services is the access and exchange of power quality data they provide" and that "developing a data access and exchange framework that addresses the issues with the current arrangements is in consumers' long-term interests".

To enable the mass deployment of DER, every element of the installation (equipment, services, maintenance, and support) must be optimised. Enabling access to the site revenue *metering installation* at a local level for the read only provision of *connection point* site power data (inclusive of real time *voltage*, current, *active power*, *power factor*, *frequency* etc. Ref NER Table S7.5.1.1) at a polling interval of no greater than 1 second, would potentially mitigate the need for the installation of multiple third-party meters at a *small customer* site. In some instances, additional metering may still be required so that individual circuits can be measured, or to participate in grid services such as contingency FCAS, i.e. where the revenue meter cannot locally provide contingency FCAS signalling and event data. Some of these issues will soon be solved by the upcoming launch of MASS specification metering, however local access is still an issue that would need to be resolved from both a regulatory and equity perspective.

Small customer access to metering data – NER/regulatory implications:

The Commission's summary of issues (identified as a result of the discussions and insights around the exchange of power quality data) is largely silent on access to data **locally** at the *metering installation*.

We understand from the NER that a *small customer* can currently access their *metering data* (Ref NER 7.15.4 (b)(3) either directly, or may cede this right to a 3rd party where consent is given by the *small customer* (Ref NER 7.15.5(d)(2). Such access, however, is typically via the *small customer's* Retailer, and is usually delayed by a number of business days and mostly confined to historical interval energy data (kWh). Such data is unsuitable for the orchestration of behind the meter DER.

BTM DER orchestration requires local access to real time power flow information (as detailed in above ref Table S7.5.1.1 of the NER), that is typically on a 1 second update (with 50ms capability where MASS contingency FCAS measurement is supported).

We appreciate that from a regulatory perspective, local data access would require changes to the NER. This could be achieved by the introduction of a further category of market participant such as an "aggregator" that can access the *metering installation* as defined under clause 7.15.4. (e). Further, if an aggregator (or similar) market participant was authorised to access data under 7.15.4 (e), such access could be restricted further than specified in clause 7.15.4.(e) i.e. not only by password, but to also require the authorisation by the *small customer* to access their *metering installation*.

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Revenue *metering installation* technical and other integration issues:

There are technical integration issues with a *metering installation* that will need to be addressed to enable the provision of power quality data. Additionally, any local integration to the revenue meter for the purpose of DER orchestration must offer a more cost-effective option than the alternative (current) installation practice of multiple third-party meters at a *small customer* site.

Changes to the NER to enable local access to the revenue *metering installation* for local real time data access will not on its own solve these issues. If the initial integration cost, and ongoing access costs are prohibitive, or do not provide an ROI significantly less than current alternatives, then the industry will simply continue the current practice of installing multiple third party meters.

Currently the physical integration options are:

1) Access to a smart meter communications port, which is typically under a sealed cover and requires a Level 2 electrician to break and re-seal;
2) Access to the optical port of the meter (compliant with IEC 62056-21). This offers a more cost-effective option from an installation perspective but comes with additional risks of removal by another party.
3) Wireless access to the revenue meter. This option would require the standardisation of wireless access/security across smart meters. This is unlikely to happen in the absence of regulation.
4) If multiple parties require access to the data, neither option 1 or 2 are suitable. i.e. both those access options are on a "first in" basis, assuming the necessary permissions.

However, the adoption of IEEE2030.5 by DNSPs, and the desire to have a *small customer* site participate in grid security of supply via an operating envelope, lends itself to a "whole of site" approach to DER orchestration behind a single IEEE2030.5 compliant edge gateway.

Such an approach to the orchestration of site DER would solve several problems, negating the need for multiple third-party meters and ensuring the *small customer* can "churn" their site via a standardised interface to the Energy Market Service Provider of their choosing. Irrespective of the integration option chosen, there would be only one site integration required, i.e. to the *metering installation* for the provision of power quality data as detailed previously (per NER Table S7.5.1.1), and hence no need for multiple DER power meters at the *small customer* site for the purposes of DER orchestration.

DER interoperability at a local level would however be required for complete site wide orchestration behind the proposed standards compliant IEEE2030.5 edge gateway. This approach is also consistent with providing firm and predictable responses from DER for grid services as, for example, a separately controlled DER that is not part of the orchestration may react to a grid condition (e.g. provide a Contingency FCAS response), only to have that response immediately neutralised by an onsite HEMS that is unaware of the Contingency FCAS response This is not a future issue, this is happening now on *small customer* sites.

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For such an approach to be successful, however, DER vendors would need to support open, local access (standards based) communications and full control functionality. This is not currently the case, with some DER vendors not supporting interoperability. This is unlikely to change without regulation.

This does not solve the problem in situations where DER vendors choose not to participate in whole of site orchestration. The risk is that "first in" vendors have sole access to the local metering data. To encourage such vendors to take an alternate approach, the commission may decide to restrict access to local *connection point* metering data to only those vendors that support open access, standards compliant edge gateways (e.g. IEEE2030.5). We would encourage industry consultation on this issue.

Further, we are unsure whether the rights of a *small customer* (or their appointed agent) to physically (magnetically) attach a removeable optical interface device to the revenue meter would require a regulatory change for clarity to ensure that the *small customer* (or their appointed agent) was not charged for such access, and that such access could "transfer" seamlessly across retailers and/or aggregators. We note that simple magnetically attached optical devices that count the openly available basic energy pulse data of the revenue meter already use this method to provide homeowners with basic energy usage information. However, it would need to be clear under the NER that such a connectivity option was indeed permitted (if authorised by the *small customer*), and free of any charges to the *small customer* if enabling access to the revenue meter power/energy data locally and the *metering installation* in real time.

Per connectivity option 3, we are aware that some metering manufacturers have signalled the possibility of providing access to *metering installation* data via a local wireless connection. Whilst that is certainly worthy of consideration, such access and security issues would still need to be addressed with the NER defining how a *small customer* (or their appointed agent) could access real time data (as defined in the NER Table S7.5.1.1) for the local orchestration of BTM DER.

Security of access to the *metering installation*:

Whilst the actual physical integration at the *metering installation* for local access to power quality data is one challenge, currently the NER precludes local, real-time, third-party access to revenue meter *energy data*. Currently such local and remote access to the *metering installation* is confined to only the Metering Coordinator, Metering Data Provider Embedded Network Manager, and AEMO. (Ref 7.15.4 Additional security controls for small customer metering installations – subclause Ref 7.15.4 (e)).

This would need to be addressed if the smart meter was to provide local real time access to power quality data for the orchestration of BTM DER**.**

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